THE death occurred in January this year, at seventy-five years of age, of DR. JÛLES HARMAND, who was well known for his extensive explorations in French Indo-China. In 1873 Dr. Harmand took part in the investigations of the ruins of Angkor, in Cambodia. His explorations in subsequent years embraced the basin of the Tonle Sap and the lake of that name, as well as the country between there and Bassac, on the Mekong. In 1877 Dr. Harmand explored the Boloveu plateau in Laos, and succeeded in crossing the mountainous country to Hué, in Annam. These explorations shed much light on the interior of Indo-China, and gained for Dr. Harmand in 1878 the gold medal of the Paris Geographical Society. Later he entered the diplomatic service and was for many years French ambassador at Tokio. Dr. Harmand was the author of "Domination et Colonisation," published in 1910, and he prepared a French edition of Sir John Strachey's "India" in 1892.

WE learn with regret from *Science* of April 22 that the death occurred on April 14 of DR. HENRY PLATT CUSHING, who was for twenty-six years professor of geology in Western Reserve University, Cleveland, Ohio, and for about the same time geologist in the Adirondack region for the Geological Survey of New York.

Notes.

"CULTURED" pearls, recently introduced by a Japanese firm, appear to have caused some alarm in the gem trade. It has long been known that pearls are the result of local irritation in the pearl-oyster or pearl-mussel, caused by the introduction of some foreign matter—usually the larva of a parasitic organism which spends another part of its life-cycle in an animal that feeds on the mollusc. The mollusc retaliates by coating the unbidden guest with a smooth layer of nacre (identical with the mother-of-pearl layer of its shell, and consisting mainly of the orthorhombic crystalline modification of calcium carbonate corresponding with the mineral aragonite); and the resulting pearl is the elegant tomb of the objectionable parasite. The Chinese have for centuries produced this result artificially by inserting objects between the shell and mantle of the fresh-water mussel, and figures of Buddha on the inner surface of such shells are common. The difficulty hitherto has been to cause the formation of a spherical secretion unattached to the shell of the mollusc. This now appears to have been achieved by Mr. Mikimoto as a result of experiments extending over forty years. It is said that fragments of mother-of-pearl are inserted in the tissues of the molluscs, which are then returned to the sea for a period of several years. Another obvious method would be to infect the oyster-bed with the appropriate parasite. But, whether the foreign matter is introduced accidentally or intentionally, the result produced by the oyster must be the same. The qualification "artificial" would here apply rather to the pretence that the products are essentially different. Attempts on the part of the trade to discredit what is apparently an interesting scientific discovery are clearly made only with the view of keeping up inflated prices. The same selfish fight was made some years ago against the artificially formed rubies and sapphires (miscalled "synthetic," "reconstructed," and even "imitation"), which can be produced much more economically than the naturally formed stones. Strawberries raised in pots under glass are sold without question as strawberries—but wisely at a higher price. Pearls are high in price because of their rarity, but if they were plentiful and the more brightly coloured mother-of-pearl were rare the cry would be very different.

THE Kelvin gold medal for engineering was founded in 1914, principally by British and American engineers, to commemorate the achievements of Lord Kelvin in those branches of science which apply specially to engineering. The award is made by a committee of the presidents of the representative British engineering institutions, and recommendations are received and considered from similar bodies in all parts of the world. The first recipient was Dr. William Cawthorne Unwin, and the presentation was made by Mr. A. J. Balfour in the hall of the Institution of Civil Engineers on Wednesday, May 4. In the course of his address Mr. Balfour said that Lord Kelvin combined in a manner which had scarcely been equalled before, except perhaps by Archimedes, the power of theorising on the darkest and most obscure secrets of Nature, and at the same time of carrying out efficiently and practically some engineering feat. It was therefore fitting that we should remember Kelvin as one of the leaders in the movement which compelled all modern engineers worthy of the name to be not only men of practice, but also of theory. Dr. Unwin's name was honoured wherever engineering was studied in English-speaking lands, and he had imprinted his own seal upon the whole course of study which young engineers had now to pursue. In his reply Dr. Unwin congratulated the young engineers of to-day upon their advantages in the possession of well-organised colleges and on the recognition by all universities, even Oxford and Cambridge, of a faculty of engineering.

WE are very glad that a reasonable agreement has been arrived at between supporters and opponents of the Plumage (Prohibition) Bill, with the result that the Bill passed through Standing Committee D of the House of Commons on May 10. It has often been suggested that an advisory committee should be set up to prepare a schedule of birds the plumage of which might be imported, but this has been objected to by promoters of prohibitive measures. The agreement now arrived at includes the following terms:—

(1) The Act to come into operation nine, instead of six, months after the passing thereof. (2) Within four months after the passing of the Act the Board of Trade shall appoint a joint Advisory Committee consisting of an independent chairman, two expert ornithologists, three representatives of the feather trade, and four other independent members. The function of this Committee will be to advise the Board of Trade as to additions to and removals from the existing schedule (ostrich and eider-duck) of birds the plumage of which may be imported. By the adoption of these clauses the Bill will in all probability be placed on the Statute Book during the present session of Parliament.

AN announcement in the *Times* of May 9 states that Sir Hercules Read, Keeper of the Department of British and Medieval Antiquities and Ethnography of the British Museum, will retire in July next on completion of forty years' service. Sir Hercules Read joined the museum staff in 1880 under Sir Wollaston Franks, with whom he had worked for six years previously, and whom he succeeded in 1896. Under him the department has developed greatly, particularly in connection with prehistoric and medieval antiquities. By his influence among wealthy connoisseurs, of whom he numbered a great many among his friends, he was able to secure for his department and the nation a large number of valuable specimens of artistic or scientific importance which otherwise might have been lost to us. Mr. J. Pierpont Morgan was largely guided by him in his generous gifts to public collections, and it was at his instigation that the famous Greenwell collection of Bronze-age antiquities was secured and presented by Mr. Morgan to the museum. Sir Hercules Read's connection with the British Museum will not be severed by his retirement. As president of the Society of Antiquaries he will continue to act as a Trustee *ex officio*.

IN presiding at a dinner given by the council of the Iron and Steel Institute to the president, Dr. J. E. Stead, last week, Sir Robert Hadfield spoke at some length on the industrial crisis in this country. He took the view that the present Labour disturbance was unreasonable, since it had been admitted by some of the miners' leaders that its object was political. He stated that no one wished to see reductions in the income of the wage-earners less than he did, but that the existing fictitious state of affairs, both financial and industrial, made it impossible for us to get on a sound footing until some re-adjustment, in which all were concerned, took place. Sir Robert Hadfield went on to urge the need for a greatly increased output per worker, stating that it was only in this way that industry could be restored to an economic basis. In the latter part of his speech he dealt with technical problems, alluding particularly to corrosion, affirming that his study of this question, in so far as it related to iron and steel, had convinced him that the annual wastage was from 1·5 to 2 per cent.

AT a general meeting of the members of the Royal Institution held on May 9 Sir J. J. Thomson was elected honorary professor of natural philosophy and Sir Ernest Rutherford professor of natural philosophy.

AT the meeting of the Royal Society held on May 5 the following were elected foreign members:—Prof. Albert Calmette, Dr. Henri Deslandres, Prof. Albert Einstein, Prof. Albin Haller, Prof. E. B. Wilson, and Prof. P. Zeeman.

AT the annual meeting of the British International Association of Journalists, held on April 22, Mr. Leon Gaster, the hon. secretary of the Illuminating Engineering Society and editor of the *Illuminating Engineer*, was unanimously elected the honorary general secretary of this association.

BY invitation of the chairman of the Lawes Agricultural Trust Committee, Lord Bledisloe, and the director, Dr. E. J. Russell, the House of Commons Agricultural Committee and certain members of the House of Lords will visit the Rothamsted Experimental Station, Harpenden, to-morrow, May 13, to inspect the experimental farm and the laboratories.

THE last ordinary scientific meeting of the Chemical Society this session will be held at the Institution of Mechanical Engineers, Storey's Gate, on June 16 at 8 p.m., when Prof. Benjamin Moore will deliver a lecture entitled "The Natural Photo-synthetic Processes on Land and in Sea and Air, and their Relation to the Origin and Preservation of Life upon the Earth."

THE Empire Cotton-Growing Committee and the British Cotton Industry Research Association propose to award in July next about twelve studentships, each of the annual value of 200*l*., for the additional training of university graduates in scientific research bearing on plant genetics and physiology, entomology, physics, etc., or in special subjects relating to administration and inspection in tropical agriculture. Forms of application and further particulars of the studentships are to be obtained from the secretary of the Joint Standing Committee, c/o the Shirley Institute, Didsbury, Manchester, not later than July 18.

THE officers and council of the Manchester Literary and Philosophical Society for the new session 1921–22 were elected on April 26 as follows:—*President:* Mr. T. A. Coward. *Vice-Presidents:* Mr. R. L. Taylor, Mr. William Thomson, Sir Henry A. Miers, and Mr. W. Henry Todd. *Hon. Secretaries:* Dr. H. F. Coward and Prof. T. H. Pear. *Hon. Treasurer:* Mr. R. H. Clayton. *Hon. Librarians:* Mr. C. L. Barnes and Dr. Wilfrid Robinson. *Hon. Curator:* Prof. W. W. Haldane Gee. *Council:* Prof. Arthur Lapworth, Mr. C. E. Stromeyer, Dr. W. M. Tattersall, Mr. Leonard E. Vlies, Mr. F. W. Atack, Prof. F. E. Weiss, Mr. Francis Jones, Miss Laura Start, and Prof. Sydney Chapman. The Chemical Section on May 6 elected the following officers:—*Chairman:* Mr. Leonard E. Vlies. *Vice-Chairman:* Mr. J. H. Lester. *Hon. Secretary:* Mr. David Cardwell.

THE London summer meeting of the Institution of Mechanical Engineers, which will be held on June 30 and July 1, will be devoted to subjects connected with the better utilisation of fuels. A novel feature of the meeting will be an exhibition of appliances connected with boiler-room economy and with the efficient use of steam- and internal-combustion engines. The exhibits will include feed-water heaters, combustion recorders, super-heaters, liquid fuel and powdered fuel burners, steam- and gas-engine indicators, etc. The institution desires that all who have exhibits to offer will communicate with the secretary at Storey's Gate, St. James's Park, S.W.1, as soon as possible. Apparatus and models are preferred, but drawings will be accepted and suitably displayed.

ARRANGEMENTS have been made by the Institution of Civil Engineers to continue this year the series of conferences which were interrupted by the rebuilding of the institution premises and the war. A conference will be held on Wednesday, Thursday, and Friday, June 29 and 30 and July 1, the mornings being given to discussions upon selected topics, and the afternoons to visits to engineering works. For the purpose of the meetings the conference will be divided into seven sections: (i) Railways, Roads, Bridges, and Tunnels; (ii) Harbours, Docks, Rivers, and Canals; (iii) Machinery; (iv) Mining and Metallurgical Processes; (v) Shipbuilding; (vi) Waterworks, Sewerage, and Gasworks; (vii) Electricity Works and Power Transmission. The twenty-seventh James Forrest lecture will be delivered by Sir George T. Beilby on the afternoon or evening of Tuesday, June 28.

"THE Physiology of Pain" is the subject of a paper in *Medical Science: Abstracts and Reviews* for April (vol. iv., No. 1). The reviewer concludes: "It is, at any rate, tempting to regard sensibility to pain as the survival in us of the primordial mode of sensation. Its urgency and tendency to evoke immediate motor response is the reproduction of the normal experience of the lower invertebrates. From it the discriminative forms of sensibility have been differentiated by the progressive increase of insulation. If we view pain as an exaggerated response by a physiologically irritated nerve, it is possible to get some conception why pain is the commonest of symptoms and why it is so apt to become inveterate. Pain is, as it were, physiologically only just not present in us all, and what appears to be a very slight disturbance pathologically may prove an effective and incurable excitant of it."

DR. L. O. HOWARD's annual report of the Entomologist to the U.S. Department of Agriculture for the year ending June 30, 1920, is a record of a vast series of researches carried out for the benefit of the State. The European corn-borer is causing anxiety on account of the increasing area of country that is suffering from its ravages. With an appropriation of 400,000 dollars an energetic campaign is being conducted, and particular attention is being devoted to the natural enemies of the pest. A trained observer has been established in the south of France to study its native parasites, and Dr. Howard personally visited with the same object regions of Belgium, France, and Italy in which the corn-borer occurs. In connection with insecticides for orchard spraying, much experimental work has been accomplished with contact insecticides in an effort to find something to replace nicotine or tobacco extract. Special attention has been devoted to organic contact sprays, and a compound has been discovered of the pyridine series which offers hopes of success. As in previous years, work on the Gipsy and Brown Tail moths occupies a prominent place. During the spring of 1919 favourable climatic conditions for hatching out the eggs resulted in an unusual spread of the former insect in the caterpillar stage, and an increase in area of 4569 square miles is now stated to be infested. On the other hand, the area affected by the Brown Tail moth has been materially reduced, and 10,677 square miles have been released from the quarantine.

MR. H. G. MAY has published (Proc. U.S. Nat. Mus., vol. lviii., pp. 577–88, 5 plates, 1920) useful notes on the nematode genus Nematodirus, which occurs in the small intestine of sheep, goats, cattle, deer, camels, and certain rodents. In addition to abundant material collected in the United States, the author has received material from France and Switzerland, and has been able to study some eight hundred male specimens for their spicules. He finds in this collection four species which have not previously been described. He gives a key to, and short descriptions of, the nine species of the genus, and figures the more important systematic characters, especially the bursæ and spicules of the males.

AT a meeting of the Biological Society of Washington (Journal of the Washington Academy of Sciences, vol. x., No. 20, p. 580, December, 1920) Mr. T. E. Snyder directed attention to the extensive and serious injury caused to the lead sheathing of aerial telephone cables in California by the beetle *Scobicia declivis*, which normally breeds in recently felled wood piled for later use as fuel. In summer the beetle attacks the cable where it lies in contact with the metal suspension ring, which affords it leverage for boring. The hole allows moisture to penetrate the insulation, and numerous widely separated short-circuits are produced when rain falls in the autumn. A high percentage of "wire trouble" is caused by this beetle. No remedy has yet been found; chemical repellents, various types of suspension rings, and hard tin and antimony alloys have proved ineffective.

IN the Report for 1919 of the Botanical Society and Exchange Club of the British Isles the secretary, Dr. G. C. Drucé, provides a supplement entitled "The Extinct and Dubious Plants of Britain." Notwithstanding the great changes which have occurred in Britain during the period since 1597, only about half a dozen native species of flowering plants have ceased to exist, mainly as the result of drainage operations. The most notable are a Vetch (*Vicia laevigata*), which formerly occurred near the shore at Weymouth and Portland, but does not seem to have been found for nearly a hundred years, and two species of Senecio, formerly plentiful in the Fens, but destroyed by drainage operations. During the same period our flora has been augmented by a number of emigrants from other countries which have become more or less completely established. The dubious plants of Britain—that is to say, plants which have been reported as British—make a very long list. Some are mere casuals, many have been wrongly identified, and some, it is to be feared, were wilful impositions. The probability is that the majority were really erroneous, but Dr. Druce suggests that the publication of these records in an easily consultable form may, by directing attention to them, lead to one or two being re-discovered.

MR. N. H. DARTON (U.S. Geol. Surv., Bull. 701, 1920) has brought together "all available published data bearing on the rate of increase of underground temperature with increasing depth in the United States," including numerous original observations by the author and his colleagues. Some of the very deep wells drilled for oil give average rises of temperature of 1° F. for every 70 ft., the rise being near the surface, and in the deepest levels being about 1° F. for every 60 ft. The following records are of special interest:—McDonald, Pa. (6975 ft.), bottom temperature 144·9° F.; the Lake Well, West Virginia (7500 ft.), at bottom 168·6° F.; and the Goff Well in the same State (7386 ft.), temperature at 7310 ft. 158·3° F. The misleading nature of generalised calculations from depths of less than a mile is clearly shown by the fact that the Goff Well gives from 100 ft. to 7310 ft. a rise of 1° F. for every 70·2 ft., and from 4000 ft. to 7250 ft. of 1° F. for every 56·3 ft. The author reminds us that the workings in the Comstock Lode, Nevada, showed 170° F. at 3100 ft., the average increase in the district being 1° F. for 33 ft. The rate here decreases at similar horizons away from the lode, and local volcanic material is inferred.

THE Bureau of Standards at Washington has issued as Scientific Paper No. 406 a valuable review by Dr. Coblentz of the present position of our knowledge of the laws of radiation of a perfectly black body, and the values of the constants which enter into the numerical expression of those laws. He finds that a considerable proportion of the discrepancies between the results of determinations by different observers is due to the neglect of the absorption of the radiation on its passage from the furnace to the measuring instrument, and to its partial reflection at the receiving surface. On making suitable corrections for these losses he finds that the results are brought into close agreement. He gives as the best value of the coefficient of Stefan's law of total radiation $5{\cdot}72 \times 10^{-5}$ ergs per sq. cm. per second per fourth power of the absolute temperature. For the constant C of Planck's radiation formula he gives 14,320 micron degrees, and for the product of the wave-length for maximum radiation into the absolute temperature 2885 micron degrees. The mean value of Planck's constant h by radiation and other methods he gives as $6{\cdot}55 \times 10^{-27}$ erg-seconds.

IN the April number of the Journal of the Franklin Institute, Messrs. Loyd A. Jones and C. E. Fawkes give the results of their investigations into the action of photographic reducers on the images produced on development printing papers. The course of the change is traced in each case by measuring the density of the image after subjecting it to the reagent employed for various times. It is possible to reduce so that the contrast is either unchanged, diminished, or increased. The chief point of novelty demonstrated is the action of ammonium persulphate, which in the presence of a little sodium chloride gives a nearly proportional decrease of density. But if the persulphate is dissolved alone in distilled water there is a certain critical point on the density curve, on the thinner side of which there is very little change, while there is very vigorous action on the denser side. Even in so short a time as three minutes, that part of the curve that lies above the point is reversed in its curvature, and parts of it become less dense than the critical point itself. The authors give the formulæ of the solutions that they used.

IN his presidential address delivered recently to the Institution of Mining and Metallurgy Mr. F. W. Harbord dealt with the chief metallurgical developments which have taken place in this country since 1914. According to him, the only new industries which were established as the result of war requirements were the manufacture of tungsten powder and of ferro-alloys generally. In regard to these products the country is now able not merely to supply its own requirements, but also to compete in the chief markets of the world. The output of carbon steel was increased by more than 2,000,000 tons in 1917 as compared with 1913. More than one-half of this increase was due to "basic" steel. In the years 1916–18 arrangements were made for the erection of 22 blast furnaces and 166 open-hearth steel furnaces with a producing capacity of more than 3,000,000 tons per annum. No branch of metallurgy received a greater stimulus and made greater progress than the art of making and heat-treating special steels, especially those containing nickel, chromium, and vanadium. For many years before the war the zinc industry was in a languishing condition. Here again the productive capacity of the country has been much increased by the erection of new plant and by extensions and improvements to existing plants. The present position of this industry is quite abnormal, but when the relation between cost of production and market price becomes normal Mr. Harbord is of opinion that this country will have two very strong points in its favour, owing to the Government control of Broken Hill ore supplies and the better equipment of the extraction works.

AT the eleventh annual May lecture of the Institute of Metals on May 4 Prof. T. Turner took as his subject "The Casting of Metals," which dates back to early antiquity. The quality of the older material cannot be equalled to-day, although output has been enormously increased and the percentage of "wasters" reduced. Aluminium presents special difficulty on account of its high coefficient of expansion; this leads to fracture during cooling unless proper precautions are taken. Gases in non-ferrous metals are not so important as in steel, and any metal or alloy which does not develop gas by reaction or does not unduly segregate can be cast in a satisfactory manner provided that a suitable temperature is employed, that the mould is properly designed and made, and that the metal is skimmed and poured in the right manner. Pure metals or single substances, as a general rule, possess the same density whether slowly or quickly cooled. Those alloys in which there is an interval between the liquidus and solidus solidify over a temperature range, and often expand when slowly cooled, as, for instance, when cast in sand. Extensometer tests by Prof. Turner have shown the nature and extent of such expansions in a number of typical alloys. These results agree with the density determinations, but the extensometer has the advantage of showing the sequence and amount of each volume-change. In practice one of the chief causes of failure is pouring at too high or too low a temperature. Other causes include such troubles as imperfect or badly fixed cores, faults in moulding, cracks, misruns or run-outs, and breakage in handling. In foundry work generally the losses from all causes reach about 10 per cent. of the output. Prof. Turner took the view that casting is fundamentally an art, and the part of the man of science will be to introduce new ideas and processes rather than to improve on present technique.

THE Oxford University Press is to publish under the title of "From a Modern University: Some Aims and Aspirations of Science" a volume of occasional addresses by Prof. A. Smithells.

A LENGTHY catalogue (No. 88) of botanical and horticultural works which are for sale by Messrs. Dulau and Co., Ltd., 34 Margaret Street, W.1, has just reached us. It gives particulars of no fewer than 3017 publications, including the library of the late M. Edouard André, of Paris. Many early printed and rare herbals are listed, and practically the whole range of botany and horticulture is represented. The catalogue should be seen by all who wish to augment their libraries in these branches of science.

MESSRS. G. BELL AND SONS are shortly adding a new volume to the advanced section of their mathematical series, namely, "A First Course in Statistics," by D. Caradog Jones. The fundamental importance of the right use of statistics is becoming increasingly evident on all sides of life, social and commercial, political and economic. It is hoped that a study of this book will enable the reader to discriminate between the masses of valuable and worthless figures published, and to use what is of value intelligently.

Our Astronomical Column.

ECLIPSE OF RHEA BY TITAN.—The computing section of the British Astronomical Association, recently formed under the directorship of Mr. L. J. Comrie, undertook an extensive examination of the phenomena of Saturn's ring and satellites about the time when their planes are turned edgewise. In the course of this work the prediction was made that the very rare phenomenon of the eclipse of Rhea by the shadow of Titan would take place on April 8. A number of members of the association, including the president, Major Hepburn, observed the phenomenon, and found a satisfactory accord with the prediction. Rhea faded rapidly at 10h. 22m., and became invisible for 50 minutes; the estimated time of mid-eclipse was 10h. 47·3m. G.M.T.; the corresponding predicted time was 10h. 38m., and predicted duration 44 minutes. Since the relative motion of the satellites was slow the error in their positions is small.

It would be well if the national ephemerides could publish predictions of interesting phenomena of this character, as there is a danger of their escaping notice if left to unofficial agencies. There is probably no other observation of the kind on record in the Saturnian system; even in the Jovian system, where mutual eclipses occur more often, very few have been recorded, obviously because they have never been systematically predicted.

COMETS.—*L'Astronomie* for April contains a rediscussion by Mr. G. Neujmin of the orbit of the comet (1916*a*) discovered by him in 1916. He finds:—

$$T = 1916 \text{ March } 11{\cdot}3239 \text{ G.M.T.}$$

$$\left.\begin{aligned} \omega &= 193^\circ\ 47'\ 33'' \\ \Omega &= 327^\circ\ 33'\ \ 0'' \\ i &= \ 10^\circ\ 37'\ 12'' \end{aligned}\right\} 1916{\cdot}0$$

$$\phi = 34^\circ\ 26'\ 33''$$

$$\mu = 655{\cdot}364''$$

Period 5·414 years.

The observations used extended from February 27 to June 5. The comet should be in perihelion again about August 10 of the present year, but so unfavourably placed that it is to be feared that it will escape detection.

Comet Pons-Winnecke has been deviating from the predicted path with unexpected rapidity, and M. Ebell has deduced the following revised orbit from observations on April 12, 16, and 26:—

$T = 1921$ June $13{\cdot}08$

$\omega = 171^\circ\ 43{\cdot}7'$

$\Omega = 96^\circ\ 38{\cdot}9'$

$i = 18^\circ\ 15{\cdot}0$

$\log q = 0{\cdot}0152$

$\log a = 0{\cdot}4526$

The value of $\log a$ is almost certainly much below the truth, but the elements will probably represent the motion for the next few weeks. The ephemeris printed in this column needs to be corrected by −13m., −1° 11′ on May 14, and −25m., −1° 12′ on May 20. It will be noticed that the perihelion point is now placed well outside the earth's orbit, which makes the occurrence of a meteor shower somewhat doubtful.

Ephemeris for Greenwich Midnight.

		R.A.			Decl.			Log r	Log Δ
		h.	m.	s.	°	′			
May	14	18	5	51	47	36	N.	0·0396	9·3772
	16	18	22	0	47	44		0·0355	9·3520
	18	18	39	51	47	38		0·0315	9·3260
	20	18	59	42	47	20		0·0277	9·2997
	22	19	21	5	46	40		0·0241	9·2724
	24	19	45	20	45	34		0·0207	9·2459
	26	20	10	39	44	1		0·0177	9·2193
	28	20	37	37	41	48		0·0149	9·1948
	30	21	5	2	38	56		0·0123	9·1725
June	1	21	32	26	35	22		0·0101	9·1541
	3	21	59	16	31	4		0·0082	9·1404
	5	22	24	46	26	17		0·0066	9·1333
	7	22	48	23	21	8		0·0053	9·1324
	9	23	9	58	15	50		0·0044	9·1391
	11	23	30	28	10	41		0·0037	9·1517
	13	23	48	27	5	45		0·0035	9·1695
	15	0	4	26	1	17	N.	0·0036	9·1914
	17	0	18	52	2	45	S.	0·0040	9·2158